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Evidence suggests that female military populations are at greater risk than their male counterparts for certain training and combat-related illnesses and injuries. Precise etiologies, risk factors, and impact of disease and injury in military women are not available. The objective of this prospective, multi-site, epidemiologic study is to define the patterns of illness and injury in military women. Musculoskeletal injuries have been emphasized due to their high cost in terms of morbidity, lost training time, and attrition. A computer-based outpatient tracking system for on-site, prospective data collection, originally designed for studying male trainees, was developed. This system was modified to include medical diagnoses pertinent to female personnel, and it has been implemented at (1) OCS, Quantico (USMC female officers); (2) MCRD, Parris Island (USMC enlisted women); and (3) RTC, Great Lakes (USN enlisted women). At MCRD, Parris Island, only musculoskeletal injuries were recorded. Over 90% of female Navy recruits and Marine Corps officer candidates reported to medical at least once. Forty-nine percent of all female recruits reported at least one musculoskeletal injury during training. Incidence rates for specific diseases and injury diagnoses were presented by type of military training. Databases will be used to address morbidity and attrition issues and to target areas for future preventive interventions.

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INTRODUCTION

The scientific knowledge concerning illness and injury among women in the military is primarily anecdotal. Studies to date describing the patterns of disease and injury in active-duty military populations have dealt almost exclusively with men. Despite evidence that suggests that women use medical facilities more frequently[1] and are at greater risk (relative to men) for certain types of training[1-3] and combat-related[4-7] illnesses and injuries, little has been done to characterize the exact nature and extent of these problems. Precise information on the specific diagnoses and occurrences of illnesses and injuries is necessary to determine the impact on training, attrition, operational readiness, and the overall health and well-being of our female populations. This is particularly critical in light of current efforts to expand the role of women in combat-related missions.

Most of the studies of disease and injury in military women with operational assignments were performed during Operation Desert Storm.[4-8] Although relatively few in number, the studies have suggested that the patterns of disease/injury in women differ from those in men. In one study[6] comparing medical disorders between male and female soldiers, both men and women had high rates of musculoskeletal injuries and minor acute infectious diseases. However, men were more likely to be diagnosed with orthopedic and dermatological disorders, while women were more likely to be diagnosed with psychiatric and optometrical problems. Three investigations[4,5,7] showed that women reported symptoms of stress more frequently than their male counterparts, while another showed no significant difference.[8] These studies demonstrate that effective medical and military strategic planning will depend on an accurate quantification of the differential health care requirements of male and female military personnel.

In military training populations, epidemiological studies involving female subjects have focused primarily on musculoskeletal injuries.[1-3,9-12] The data clearly demonstrate that female trainees are at significantly greater

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risk of incurring a musculoskeletal injury during basic training than are
their male counterparts.[1-3,9-12] At Marine Corps Recruit Depot (MCRD), Parris
Island, 45% of female recruits suffer an orthopedic injury compared with 29%
of male recruits.[2] Similarly, Jones et al. found that U.S. Army female
trainees have a much higher incidence of exercise-related injuries than do
male trainees, 44.6% compared to 29.0%.[3] Other studies have reported that
stress fractures occur up to 12 times more often in female trainees than in
male trainees.[11] Stress fractures are a serious overuse injury of bones that
require several weeks to several months to rehabilitate. In our recent studies
among male recruits at MCRD, San Diego, we have demonstrated a 3-4% stress
fracture incidence rate with an estimated annual cost in excess of $12
million.[13] The implications of all these studies in terms of patient
morbidity, attrition rates, and training costs for our female military
personnel are staggering.

Several studies have indicated that appropriate preventive interventions
could significantly reduce the impact of injuries and illnesses in military
women in both operational and training communities. Markenson et al. reported
that a large proportion of the gynecological resources at Operation Desert
Storm's eight evacuation hospitals were used to treat preventable
conditions.[14] Another Desert Storm study showed that female veterans with
predeployment histories of sexual or physical abuse were more likely to suffer
combat-related posttraumatic stress disorder.[4] Finally, several studies
involving female military trainees have demonstrated a strong association
between risk of musculoskeletal injury during basic training and baseline
levels of physical fitness.[1-3,9,14]

Applying solid epidemiological methodology to assessing the impact of
morbidity and attrition on training programs is crucial. Epidemiology has
been defined as the study of the distribution of a disease or physiological
condition in human populations and of factors that influence this
distribution.[15] As such, epidemiology traditionally has been concerned with

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etiologic questions. The definition implies two parts: descriptive and analytic.

In descriptive epidemiology, one addresses issues of the distribution of a health event. The event may be described using incidence rates, prevalence rates, or the duration of the disease or illness in question. Time trends are also of interest, such as the relationship of morbidity to phase of training. Statistical adjustments can be made for confounding variables.[15]

In contrast, analytic epidemiology is concerned with the determinants of morbidity. Analytic studies depend on data collected specifically for a research project and seldom can rely on routinely available data. Data of this type are almost always observational (as opposed to experimental) in nature; therefore, in attempting to demonstrate an association between a postulated risk factor and a disease outcome, one must be alert to the possibility of confounding the association by other factors. Much of the statistical methodology used in analytic epidemiology is directed at recognizing and correcting confounding; therefore, the methods of analytic epidemiology tend to be more complex than those of descriptive epidemiology. Many sources of bias and imprecision can affect observational epidemiological data. Control of these adverse effects is achieved through careful choice of study design. Randomized, prospective study designs of cohorts of individuals are among the strongest designs.[15]

A field-tested Naval Health Research Center (NHRC) computer-based outpatient tracking system was developed recently to obtain detailed epidemiological information required for analytic studies. The researcher and clinician agree in advance upon diagnostic case definitions. The software associated with the system provides complete patient tracking. Data are coded and entered by precise International Classification of Diseases, 9th revision (ICD-9) diagnostic categories. The system allows for prospective data collection beginning at the time of initial evaluation by the clinician. The system has built-in flexibility; new variables of clinical interest can be

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added and efficiently analyzed at any time. Programming allows the clinician to access the data collected to help solve relevant clinical problems.

A method for systematic collection of outpatient data will be essential for the accurate determination of patterns of disease and injury in female military populations. The information will quantify the impact of women's health issues on attrition, training costs, and operational readiness. It will target areas for preventive intervention and provide a mechanism to test their effectiveness.

The aim of this integrated project was to apply both epidemiological and analytical techniques to answer morbidity and attrition research questions of importance to clinicians serving specific military training populations. Specific objectives include the modification of a computer-based tracking system to include comprehensive medical diagnoses for female Navy and Marine Corps recruits and the determination of rates, etiologies for morbidity, lost training days, and attrition. It is anticipated that the surveillance system will be exported to Army female training populations and utilized to collect data and to target areas for future preventive interventions.

METHODS

Study Population

This project was a multi-site, prospective, epidemiological study. Data were collected at four sites and will ultimately include all female recruits in the Navy, Marine Corps, and Air Force. Marine Corps sites include Officer Candidate School (OCS), Quantico, where all female officer candidates (approximately 200 per year) are trained, and Marine Corps Recruit Depot (MCRD), Parris Island, where all female recruits (approximately 2,000 per year) are trained. The Navy site is at the Recruit Training Command (RTC), Great Lakes, the only Navy boot camp site for men and women (approximately 8,500 per year) as of October 1994. Air Force female recruits will be studied

at Lackland Air Force Base, and data gathered at this site will be reported under another Defense Women's Health Research Program proposal. The populations at risk are determined by obtaining data from training departments at the various sites. Corrections will be made for training programs that send trainees off-site (where trainees, if injured, would not be seen at the clinic doing the data collection). Methods for data collection for incoming Army recruits will be evaluated using information from the initial three sites.

The military training at each site is very different and specific to the needs of the services. Consequently, the period of risk for these populations is different. Training at MCRD, Parris Island, is a 13-week physically arduous program with a very regimented schedule of activities. Many activities are performed in the military "field" setting with emphasis on weapons and combat training, and core values. Women are trained in platoons of 60 to 80 recruits that perform all of their activities together. Navy basic training at RTC, Great Lakes, is a 9-week program that emphasizes academics, naval education, and core values. The program includes a very active schedule but emphasis is not placed on arduous physical activity. Women are trained in divisions of 60 to 84 recruits that perform all their living and training activities together. Officer Candidate School for the Marine Corps varies in duration depending on the background of the trainee. Some candidates attend a 10-week course, and others attend a 6-week course. This training is very physically arduous, and trainees are encouraged to perform much of this physical training at an individual pace. Women are only trained during the summer months at OCS.

Application Program

The system is a value-added package, which requires a minimum of a 386 microprocessor and uses the database software Microsoft FoxPro version 2.5 as

its platform. The program is divided into two main modules, designated as System and SMARTS (Sports Medicine and Research Team System). Each is further divided into six System submodules: Help, System Maintenance, Calculator, Calendar/Diary, Clear, and Quit. SMARTS system programming staff provide on-line help and technical support.

The Help submodule assists users by providing explanations of commands used in the program. System Maintenance allows production of diskette backup copies of data and export of data via modem. The SMARTS program uses the communications software package ProComm Plus and Aspect script language version 2.01 to transfer data. The Calculator and Calendar/Diary submodules are unaltered from FoxPro and remain in the SMARTS program for personal usage as needed. The Clear submodule clears the screen, and the Quit module executes exit from the SMARTS program.

The SMARTS module has five submodules: Daily Update Tasks, Patient Menu, Diagnosis, Reports, and Maintenance. Daily Update Tasks allow a user to maintain current patient information by updating a previously unknown diagnosis to a working or final diagnosis by modifying data entry fields. The Patient Menu options include checking-in and checking-out patients as well as express check-in, which allows a user to save time by initially entering only the patient's social security number (SSN), and adding the remaining information at a more convenient time. Diagnosis, the third submodule, is used to assign diagnoses by ICD-9 codes. For diagnoses of musculoskeletal disorders, this list can be prompted by anatomical location. The Reports submodule provides routines to perform inquiries, check on data, and produce reports. Reports are available on morbidity for an individual patient or for groups of patients across encounter dates and diagnoses. This submodule also provides a daily log and a provider log, which tally the number of patients seen daily. The Maintenance submodule allows each clinic to manage listings of its health care providers and class schedule.

Variables

Collected variables are recorded in the SMARTS system. The variables cover a wide range of demographic data, training cycle data, encounter data, clinically suspected risk factors, confounding variables, and diagnosis of patients presenting to the clinic. The majority of variables were identical at all four sites. The system core variables are noted in Table 1. The ICD-9 codes were further expanded to include comprehensive medical diagnoses for women (Table 2).

Installation

Implementation has been completed at all four sites. Dedicated data entry staff have been placed at three sites (Parris Island, Great Lakes, and Quantico). These staffs were orientated on the research project and trained in using the software. On-site briefs were delivered to research staff and clinic health care providers. All patient encounters (injury and general illness) are captured in the surveillance system at Great Lakes and Quantico. At Parris Island, the system is located at the Sports Medicine Clinic and thus captures only musculoskeletal injuries.

The hardware investment at each site was dependent on patient volume of each medical facility and physical layout of the building. Two separate stand-alone systems were required to collect outpatient data from women at Quantico because training for female U.S. Marine Corps Officers occurs at two sites approximately 30 minutes apart. The volume of outpatients seen at the medical facility for recruit training at RTC, Great Lakes (15,000 males and females per month), in addition to the physical layout of the building, required eight stand-alone systems to ensure data capture on all outpatient encounters.

Upon installation of each system, documentation of the approval of the purchase of the equipment was provided to the respective information management departments. The system programmer accompanied all hardware for

installation and ensured the successful operation of the software. An NHRC site coordinator trained all personnel at each location on the use and purpose of the system.

Each site provided a primary operator for each stand-alone system as well as anyone who may have the opportunity to use the system for training. Ninety personnel at the four sites were trained in the proper and complete use of the system. The principal investigator provided on-location training to all clinical providers on the goals and methodology of the system, database development, and the purpose of the project. In addition to the existing Branch Medical Clinic personnel, a full-time research assistant has been hired at RTC, Great Lakes; OCS, Quantico; and MCRD, Parris Island. The full-time research personnel act as on-site liaisons for the project, coordinate data collection and data requests, and augment data entry when necessary.

Morbidity Classification

Every encounter captured by the tracking system is coded by the specific ICD-9 diagnosis; however, reporting of the wide variety of diagnoses has been provided in the disease categories according to the general ICD-9 groupings. Some of the general disease groups were subcategorized to breakout specific disease diagnoses or conditions of interest to training populations.

Analysis

Epidemiological data presented for this report were based on encounters at the medical treatment facility for new injuries and illnesses developed during training. Incidence rates were calculated as the number of women with at least one occurrence for a general diagnostic category or specific diagnosis divided by the total number of women for that site, and it was represented per 100 women. The frequency distribution of each general diagnostic category at each site was calculated as the number of new

encounters for a given category divided by the total number of new encounters for that site. For RTC, Great Lakes, and MCRD, Parris Island, the illness and injury distribution over time was determined by the number of new illness or injury encounters for the week of training divided by the total number of new encounters for that site.

RESULTS

The study subjects for this report were chosen based on the time frame of the operation of the outpatient tracking system at each of the two Marine Corps sites and the one Navy site. The MCRD, Parris Island, system was installed in December 1994, and after testing the first 2 months of collected data entry as a trial for data validity, data for this site came from 1,054 women arriving at basic training from March to December 1995. The system at OCS, Quantico, was installed in January 1995, however women are only trained at this site during the summer so the morbidity data for this report came from the 186 women trained during fiscal year 1995. Finally, the tracking system for RTC, Great Lakes, was installed in January 1995, and data in the system were complete beginning in April 1995; therefore the data for this site will come from the 4,452 women arriving at basic training from April to October 1995.

At RTC, Great Lakes, 4,059 (91%) of the 4,452 female Navy recruits presented to the clinic with 7,619 new diagnoses during the nine weeks of basic training. One hundred sixty-nine (91%) of the 186 female Marine Corps officer candidates incurred 433 new diagnoses during OCS. Of the 1,054 female Marine Corps recruits at MCRD, Parris Island, 526 (49.9%) recruits reported 914 new musculoskeletal injuries during the 13 weeks of basic training. Tables 3 and 4 present the incidence rates of illness and injury at RTC, Great Lakes and OCS, Quantico. During boot camp at RTC, Great Lakes, 31.0% of all

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female trainees reported to the medical clinic with respiratory or ear, nose, and throat (ENT) disorders, 30.9% with musculoskeletal disorders, and 27.8% with genitourinary disorders. The category of genitourinary disorders was largely made up of gynecological examinations, which are the typical clinical follow-up for abnormal screening tests performed prior to beginning training. The most common single condition among female Navy recruits was upper respiratory infection (19.5%), followed by gastritis/gastroenteritis (11.3%). Musculoskeletal injuries occurred in 59.1% of female officer candidates at Marine Corps OCS. Dermatological disorders were seen at the clinic in 26.3% of Marine officer candidates, and 24.7% of candidates reported with respiratory/ENT disorders.

The incidence of the most common specific musculoskeletal injuries at RTC, Great Lakes; OCS, Quantico; and MCRD, Parris Island, are presented in Tables 5, 6, and 7. The types of injuries most commonly reported by all three sites fall into the classification of overuse problems. One of the overuse injuries with a high impact on training programs is stress fractures, which occurred in 2.3% of female Navy recruits, 9.1% of female Marine Corps officer candidates, and 4.9% female Marine Corps recruits.

The distribution of outpatient morbidity at RTC, Great Lakes, is presented in Figure 1. Approximately one half of all outpatient encounters among Navy recruits were for musculoskeletal injuries and respiratory/ENT disorders. Just over 60% of all encounters among female Marine Corps officer candidates were for musculoskeletal injuries and respiratory/ENT (Figure 2).

Both Navy and Marine Corps recruit training programs have very regimented schedules, and morbidity can be distributed according to week of training (Figures 3 and 4). Forty-six percent of the injuries in Navy recruits were presented to the clinic in the first 3 weeks, with the remaining injuries occurring in declining proportions until graduation. Musculoskeletal injuries continue to occur in large percentages until Week 6 at MCRD, Parris Island, when the proportion of injuries seen each week declines until graduation.

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Illnesses at RTC, Great Lakes, were presented to the clinic in a bimodal distribution with peaks occurring during Weeks 1 and 2 and then again during Week 5.

CONCLUSIONS

This prospective, multisite, epidemiological study has resulted in three main accomplishments: (1) development and successful installment of a software tracking system for outpatient morbidity in women at three Navy and Marine Corps training sites, (2) establishment of a method for determining incidence rates of outpatient general and specific diagnostic categories/diagnoses, and (3) provision of a highly accurate and flexible "platform" for research studies using outpatient morbidity as outcomes.

The software system developed for this project was based on a system developed for tracking outpatient musculoskeletal injuries in men. The system was successfully converted to a tracking system for all outpatient encounters and further upgraded to allow the capture of female-specific information. This software product functioned as a research database, clinical database, and administrative database. As a research database the system enables the collection of the "who, what, where, and when" of sound epidemiological research. It was easily modified to collect other desired information to test a given hypothesis. Data are entered by trained research staff and accuracy of all information was emphasized. This software system's ability to capture and organize all outpatient encounters for a large number of military women provided a database for describing hundreds of diagnoses and their epidemiology.

As a clinical database the system collected specific diagnostic information for initial as well as follow-up encounters. These data were entered in close proximity to the actual encounter, which is another requirement of a clinical database. Finally, the administrative functions of this system permitted the automated preparation of routine reports required by

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the specific outpatient clinic. Since most of these reports were composed of tallies of encounters in predetermined formats organized by various criteria, encounter information in an automated database was ideally suited for efficient production of these administrative reports.

The reporting of specific incidence rates of disease and injury at three military training sites permits a comparison of outpatient morbidity across different types of female populations and military training programs. One consistent finding in all three of these populations was the high rate of overall outpatient morbidity and heavy utilization of medical services by female trainees. Nearly all of the female trainees at both RTC, Great Lakes and OCS, Quantico had at least one medical encounter during their training period. This extremely high rate emphasizes the high impact medical illnesses have on the effectiveness of these programs.

Musculoskeletal injuries were one of the most common general diagnostic categories seen in all three populations. The epidemiology of musculoskeletal injuries varies, depending on the type and intensity of the individual training program. Significantly, the frequency of musculoskeletal injury in the three populations can be directly correlated to the intensity of the training. In the most physically demanding training program, OCS, 59.1% of all women presented with a musculoskeletal injury. The injury rate at MCRD was slightly less with 49.9%. The lowest injury rate of 30.8% was seen at RTC, Great Lakes, the site with the least emphasis on physical training and conditioning. Stress fractures, which primarily occur in the setting of a rapid increase in weight-bearing physical activity, can be a more accurate outcome measure of program intensity. A comparison of the stress fracture incidence rates of the three training populations resulted in similar findings, with the highest rate of 9.1% found in the Marine Corps officer candidates followed by the Marine Corps recruits (4.9%); only 2.2% of the Navy recruits incurred a stress fracture. Stress fractures is also an important outcome to track for clinical and research purposes, as they represent a

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significant injury with a high fiscal and operational impact.

The outpatient tracking system at each of the three training sites currently is being used to support other research projects and consequently is acting as a "platform" to perform specific studies. A valuable use of this system is to provide the clinical outcome data to investigate specific hypotheses. Specific diagnoses can be plotted over time enabling real time surveillance of infectious diseases. Predictive models of disease and injury incidence can be developed by relating baseline characteristics of trainees to their morbidity incidence during training. Changes to the training regimens can be evaluated by comparing disease or injury incidence after a training change to the levels of morbidity prior to the change. At RTC, Great Lakes, an extensive medical and behavioral history is collected on all incoming recruits and read into a database using an optical scanner. These history and behavior data, combined with the medical outcome data from the outpatient tracking system, are being used to investigate a number of research questions.

No comprehensive system is available to classify illness and injury adequately for epidemiological purposes within the U.S. Navy and Marine Corps outpatient treatment facilities. For example, monthly morbidity reports contain a column "musculoskeletal" with no further delineation. Such data sources, even if they were to contain more specific diagnostic information, are entirely inadequate for precise, analytical epidemiological research because confounding and suspected etiological variables are not measured. Also, the after-the-fact manner in which these data are collected makes them unsuitable for research purposes.

Further enhancements to the software system and database continue to be performed. As the types of diagnoses in women in training populations are more thoroughly documented, enhancements to the system will be made. For example, the current category of gynecological examination is composed of a variety of encounters for follow-up of routine screening prior to the beginning of training. Efforts to accurately quantify the specific makeup of

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this category are in progress. Neuropsychiatric disorders are another large category of outpatient encounters in military trainees. The system is being expanded to capture data for this category from the Recruit Evaluation Unit at RTC, Great Lakes.

Although a major aim of this project was to develop and successfully implement an outpatient automated tracking system, the ultimate goal was to establish a comprehensive database of outpatient morbidity in women. This program represents the first systematic attempt to capture specific outpatient data in female military populations. The results presented in this report are only limited examples of the utility of a database such as this. It is anticipated that these databases can enhance our understanding of the etiology of illnesses and injuries and can direct future research. Most importantly, once the core project components are in place at multiple sites, future intervention studies can be more rationally and efficiently planned and executed.

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LIST OF ALL PERSONNEL RECEIVING PAY FROM THE CONTRACT SUPPORT

1. Anh T. Le, M.S.

2. Stanley I. Ito, M.P.H.

3. Lonna Gelles

4. Patricia Tracy

5. Sally Donnell

6. Karen Maxwell-Williams, M.S.

Table 1.   The Core Variables Used in the Automated Outpatient Tracking System

Demographic

Social security number
First and last name, middle initial
Date of birth
Sex
Race
Branch of military service
Paygrade
Current station
Date reported for duty

Encounter Information

Encounter date
Date data entered
Time checked in and out
Location of treatment facility
Position at facility
Military company/division of patient
Class
Phase of training
Week/day of training

Clinical Variables

ICD-9 code
MMR (morbidity and mortality report)
Visit number
Injury activity
Patient's complaint
Provider name
Provider comments
Disposition
Duty status
Number of disposition days
Preliminary or final diagnosis
Bilateral designation
Multiple diagnoses

Table 2. Female-Specific Diagnoses Included in the Automated Outpatient Tracking System

ICD-9	Diagnosis
626000000	AMENORRHEA
625300000	DYSMENORRHEA
625000000	DYSPAREUNIA
6221A0000	DYSPLASIA OF CERVIX - MILD/CIN I
6221B0000	DYSPLASIA OF CERVIX - MOD/CIN II
6221C0000	DYSPLASIA OF CERVIX - SEVERE/CIN III
621300000	ENDOMETRIAL HYPERPLASIA
617000000	ENDOMETRIOSIS OF CERVIX
V72300000	GYNECOLOGICAL EXAMINATION
626400000	IRREGULAR MENSTRUAL CYCLE
623500000	LEUKORRHEA - NOT SPECIFIED AS INFECTIVE
621600000	MALPOSITION OF UTERUS
626200000	MENOMETRORRHAGIA EXCESSIVE OR FREQUENT MENSTRUATION
622700000	MUCOUS POLYP OF CERVIX
620000000	NONINFLAMMATORY DISORDERS OF OVARY, FALLOPIAN TUBE
624800000	OTHER SPECIFIED NONINFLAM. DISORDERS OF VULVA & PERINEUM
V22200000	PREGNANT STATE, INCIDENTAL
625400000	PREMENSTRUAL TENSION SYNDROME
626100000	SCANTY OR INFREQUENT MENSTRUATION
623300000	TIGHT HYMENAL RING (EXCLUDES IMPERFORATE HYMEN)
131000000	UROGENITAL TRICHOMONIASIS - UNSPECIFIED
625100000	VAGINISMUS
616100000	VAGINITIS & VULVOVAGINITIS, UNSPECIFIED (INCL. GARDNERELLA)

Table 3.   **Incidence Rate of Illness Morbidity Among**
RTC Great Lakes Female Recruits (N=4,452)
04 APR 95 - 10 OCT 95

	Number	Incidence Rate
Allergy/Hematology	**119**	**2.7%**
Anemia, Iron deficiency	74	1.7%
Cardiovascular	**211**	**4.7%**
Dehydration	83	1.9%
Dermatologic	**757**	**17.0%**
Blisters, ankle/foot/toes	252	5.7%
Cellulitis	119	2.7%
Contact Dermatitis	104	2.3%
Tinea Infections	180	4.0%
Gastrointestinal Disorders	**574**	**12.9%**
Constipation	90	2.0%
Gastritis/Gastroenteritis	505	11.3%
Genitourinary	**1,240**	**27.8%**
Gynecologic Exam	977	21.9%
STDs	174	3.9%
Vaginitis	81	1.8%
Musculoskeletal	**1,375**	**30.9%**
Stress Fractures	104	2.3%
Other	**563**	**12.6%**
Opthalmologic	**100**	**2.2%**
Respiratory/ENT	**1,382**	**31.0%**
Otitis	160	3.6%
Pharyngitis/Tonsillitis	216	4.9%
Sinusitis	212	4.8%
Upper Respiratory Infection	867	19.5%
Lower Respiratory Infection	162	3.6%

Table 4. Incidence Rate of Illness Morbidity Among OCS Quantico Females (N=186) 01 JAN 95 - 31 DEC 95

	Number	Incidence Rate
Allergy/Hematology	1	0.5%
Cardiovascular	16	8.6%
Dehydration	12	6.4%
Dermatologic	49	26.3%
Blisters, ankle/foot/toes	34	18.3%
Cellulitis	10	5.4%
Contact Dermatitis	5	2.7%
Gastrointestinal Disorders	27	14.5%
Constipation	1	0.5%
Gastritis/Gastroenteritis	24	12.9%
Genitourinary	14	7.5%
Gynecologic Exam	10	5.4%
Musculoskeletal	110	59.1%
Stress Fractures	17	9.1%
Neuropsychiatric	8	4.3%
Headaches	2	1.1%
Other	5	2.7%
Opthalmologic	4	2.2%
Respiratory/ENT	46	24.7%
Otitis	2	1.1%
Pharyngitis/Tonsillitis	9	4.8%
Sinusitis	18	9.7%
Upper Respiratory Infection	23	12.4%
Lower Respiratory Infection	7	3.8%

Table 5. **Incidence of Most Common Specific Musculoskeletal Injury Diagnoses Among RTC Great Lakes Female Recruits 04 APR 95 - 10 OCT 95**

| Disorder	Number	Incidence Rate
Shin Splints	150	3.4%
Plantar Fasciitis	148	3.3%
Ankle Sprain, unspecified	140	3.1%
Patellofemoral Syndrome	138	3.1%
Back Pain, Low/Lumbosacral	123	2.8%
Capsulitis, Ankle	119	2.7%
Stress Fractures	104	2.3%
Tendinitis, Patellar	103	2.3%
Metatarsalgia	84	1.9%
Back Pain, unspecified	45	1.0%
Tendinitis/Bursitis, Knee	40	0.9%
Tendinitis, Ankle/Foot	39	0.9%
Contusions, Ankle/Foot/Toes	36	0.8%
Tendinitis, Hamstring/Biceps	36	0.8%
Iliotibial Band Syndrome	31	0.7%

Table 6. **Incidence of Most Common Specific Musculoskeletal Injury Diagnoses Among OCS Quantico Females 01 JAN 95 - 31 DEC 95**

Disorder	Number	Incidence Rate
Ankle Sprain, unspecified	21	11.3%
Stress Fractures	17	9.1%
Achilles Tendinitis/Bursitis	12	6.4%
Pain, Knee	12	6.4%
Tendinitis, Ankle/Foot	12	6.4%
Contusions	11	5.9%
Iliotibial Band Syndrome	10	5.3%
Shin Splints	10	5.3%
Foot Pain	7	3.7%
Plantar Fasciitis	7	3.7%
Pain, Back	6	3.2%
Sprain/Strain, Knee/Lower Leg	6	3.2%
Patellofemoral Syndrome	5	2.7%
Fracture, closed	4	2.2%
Sprain/Strain, Hip	4	2.2%
Strain, Hamstrings/Biceps Femoris	4	2.2%
Tendinitis, Patellar	4	2.2%

Table 7. **Incidence of Most Common Specific Musculoskeletal Injury Diagnoses Among MCRD Parris Island Females**
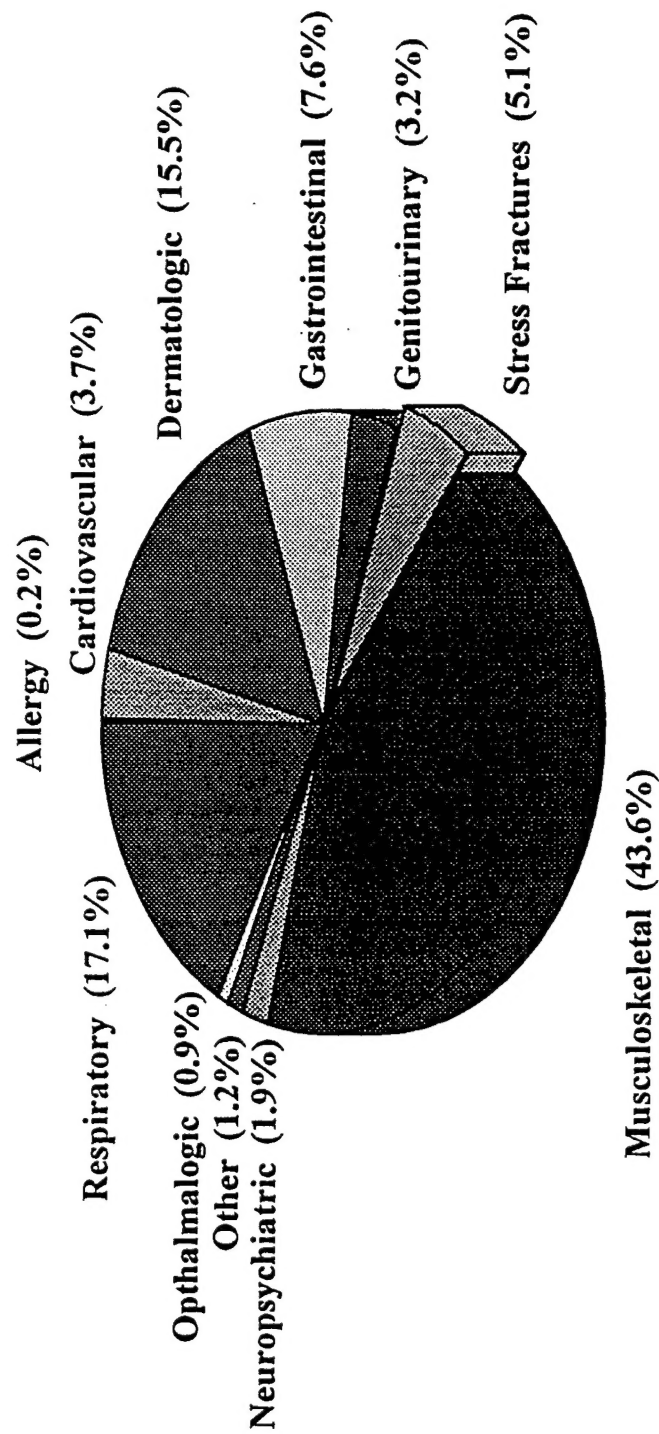**01 APR 95 - 29 DEC 95**

Disorder	Number	Incidence Rate
Blisters	120	11.4%
Ankle Sprain, unspecified	91	8.6%
Shin Splints	61	5.8%
Stress Fractures	52	4.9%
Tendinitis, Patellar	43	4.1%
Patellofemoral Syndrome	42	3.9%
Strain, Low Back	37	3.5%
Plantar Fasciitis	29	2.8%
Iliotibial Band Syndrome	21	1.9%

Figure 1
Distribution of Morbidity Among
# RTC Great Lakes Female Recruits (7,619 New Encounters)
04 APR 95 - 10 OCT 95

(N=4,452)

29
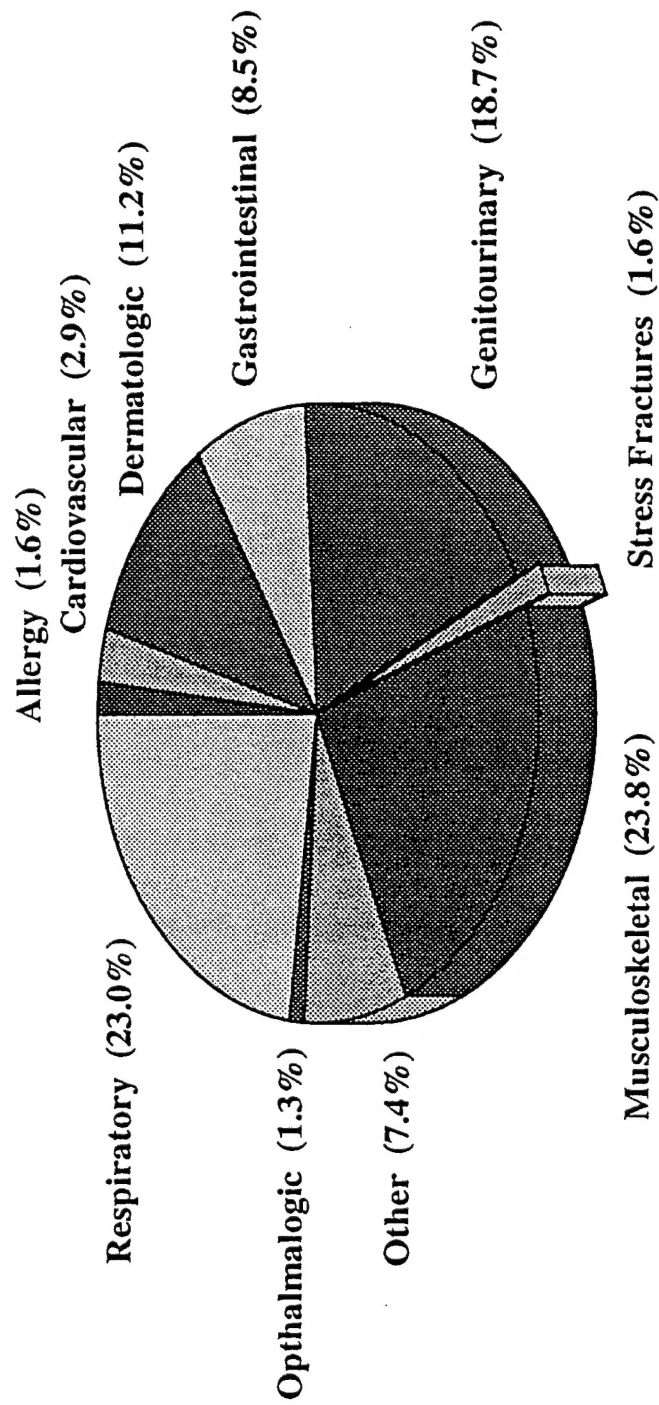
Figure 2
Distribution of Morbidity Among
OCS Quantico Females (433 New Encounters)
01 JAN 95 - 31 DEC 95

Allergy (0.2%)

Cardiovascular (3.7%)

Dermatologic (15.5%)

Gastrointestinal (7.6%)

Genitourinary (3.2%)

Stress Fractures (5.1%)

Respiratory (17.1%)

Opthalmalogic (0.9%)
Other (1.2%)
Neuropsychiatric (1.9%)

Musculoskeletal (43.6%)

(N=186)

Figure 3
Proportion of Illness and Injury by Week of Training
RTC Great Lakes Female Recruits
04 APR 95 - 10 OCT 95
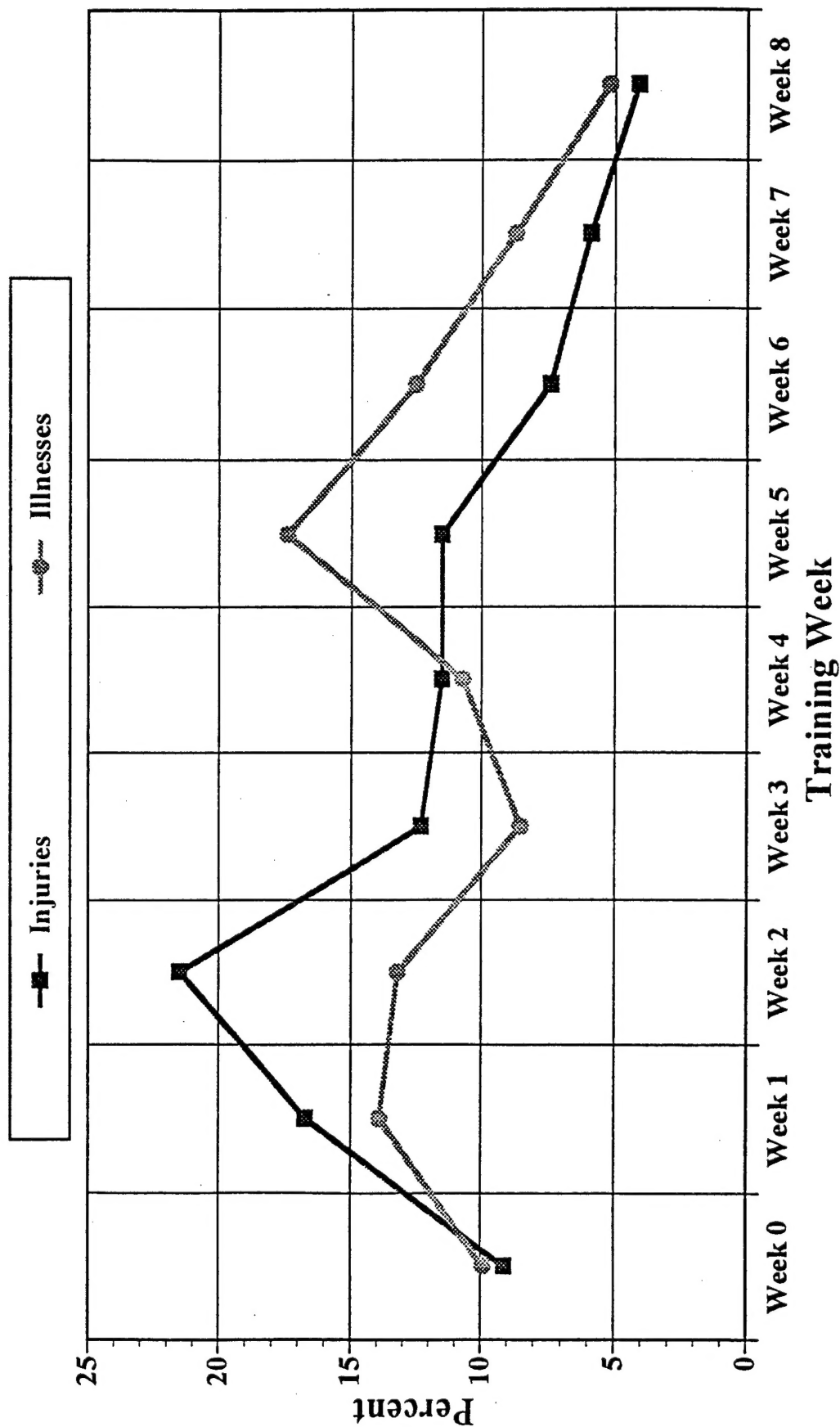
Figure 4
Proportion of Injury by Week of Training
MCRD Parris Island Females
01 APR 95 – 29 DEC 95